

An exploration of firm goals and uncertainties when acquiring a high-tech durable good: The case of CT machines

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Abstract of the Pilot Study

Computed tomography (CT) machines are some of the most expensive pieces of equipment acquired by hospitals. The purpose of this study is to understand the decision process that goes on when CT machines are acquired. Furthermore, this study explores how the decision process influences the uncertainties a hospital has about the machine ultimately acquired.

Ordinary least squares regressions and correlations were used to examine the relationship between respondent administrative status and the perceived strength of the hospital's financial goals for its most valuable CT machine, hospital control status (for-profit vs. non-profit) and the perceived strength of the hospital's financial goals for its most valuable CT machine, goal fulfillment and satisfaction with its most valuable CT machine, and goal importance and uncertainty about the most valuable CT's performance. The goals and uncertainties examined were related to revenue generation, operating cost minimization, care quality maximization, research maximization, and technological excellence maximization.

A population of 43 radiologists and radiology administrators were surveyed. All the respondents were employed in a hospital setting. Respondents were obtained at the 2009 Radiological Society of North America Annual Meeting and were surveyed by the author.

Administrators did not differ from clinicians in the extent to which they perceived their hospitals as having financial goals. However, respondents from for-profit hospitals reported a significantly greater emphasis on financial goals for their most valuable CT machines than did respondents from non-profit hospitals. A hospital's reported satisfaction with its most valuable CT machine was significantly related to the extent to which it felt its CT-related goals had been met, regardless of whether these goals were weighted by relative importance. However, satisfaction was not significantly related to the extent to which a hospital's fulfillment of its CT-related goals changed as a result of the purchase. A significant relationship was found between the importance that hospitals assigned to goals related to revenue maximization, operating cost minimization, research maximization, and technology maximization and the degree of certainty that the hospital had about their most valuable CT machine's ability to deliver on those attributes. No such relationship was found between the goal of providing quality care and certainty about the most valuable CT machine's ability to do so.

Thus, it appears that CT purchasing goals are driven by hospital control type (for-profit or non-profit status). Satisfaction with a CT machine is determined by absolute, but not incremental goal fulfillment. Hospitals generally have more certainty about attributes of CT machines that are related to their strongest goals for the machines.

When marketing CT machines, manufacturers should understand that both administrators and clinicians are likely to have a consistent understanding of their hospital's goals for CT, which are somewhat driven by their hospital's control type. Merely offering better performance than the prior equipment does not significantly improve satisfaction; instead, the equipment must help hospitals meet their goals. Manufacturers should also understand that hospitals are likely to spend more effort

researching whether a CT machine will meet their goals than whether it will perform well on attributes not related to goals.

Plan for Future Extensions

As an Ackoff Fellow, I plan to design a more rigorous version of my pilot study, which will have several extensions. One of the major weaknesses of the pilot study was the manner in which respondents were selected. As respondents were people who volunteered to answer a survey at a trade show, they may have systematically differed from the general population. For my dissertation, I plan to contact respondents from a pre-determined list, derived from the American Hospital Association Annual Survey. I will then be able to determine whether the characteristics of the non-responders differ from those of the responders.

I also plan on making some theoretical changes and extensions to my pilot study. Instead of examining whether the respondent's status as an administrator or clinician influences the goals that a hospital reports, I will examine whether the hospital's use of an administrator or clinician as the key decision maker influences the goals that are reported. The pilot tested for whether a respondent's status colored the reporting of goals, while the dissertation will examine whether the choice of decision maker type influences goals. As hospitals can control the status of the key decision maker that they select, this change to the study will make the findings more actionable for hospitals.

Additionally, I plan to extend my model in order to attempt to better understand how the variables examined in the pilot study influence the ultimate fair market value of the CT machine acquired. The dissertation will additionally examine the relationship between certainty about an attribute of the CT machine and the value of the CT machine, the key decision maker's status (administrator or clinician) and the value of the CT machine, and the hospital's status (for-profit or nonprofit) and the value of the CT machine. It is hypothesized that increased uncertainty about CT machine attributes which are associated with losses will lead to bigger investments in CT, while increased uncertainty about CT machine attributes which are associated with gains will lead to smaller investments in CT, as would be suggested by Prospect Theory. It is further hypothesized that when the key decision maker is an administrator, financial uncertainty will have a greater impact on the value of the most valuable CT machine, while when the key decision maker is a clinician, non-financial uncertainty will have a greater impact on the value of the most valuable CT machine. A similar pattern is hypothesized for hospital status, with the value of the most valuable CT machine more impacted by financial uncertainty for for-profit hospitals and more impacted by non-financial uncertainty for non-profit hospitals. These hypotheses were formed on the assumption that for-profit hospitals and administrators hold financial goals more strongly than nonprofit hospitals and clinicians.

Overall, this study will accomplish three things. First of all, it will provide an empirically-tested framework for understanding how firms acquire a high-tech durable good. While the majority of the decision making literature focuses on the individual, with rare exception (Bowman, 1980, 1982; Fiegenbaum & Thomas, 1986; Fiegenbaum, 1990), this paper focuses on decision making by firms. Second, it will contribute to Plan/Goal Theory (Krantz & Kunreuther, 2007) by empirically testing the relationship between goal fulfillment and satisfaction. Finally, it will provide some of the first insights into the relationship between goals and uncertainties.

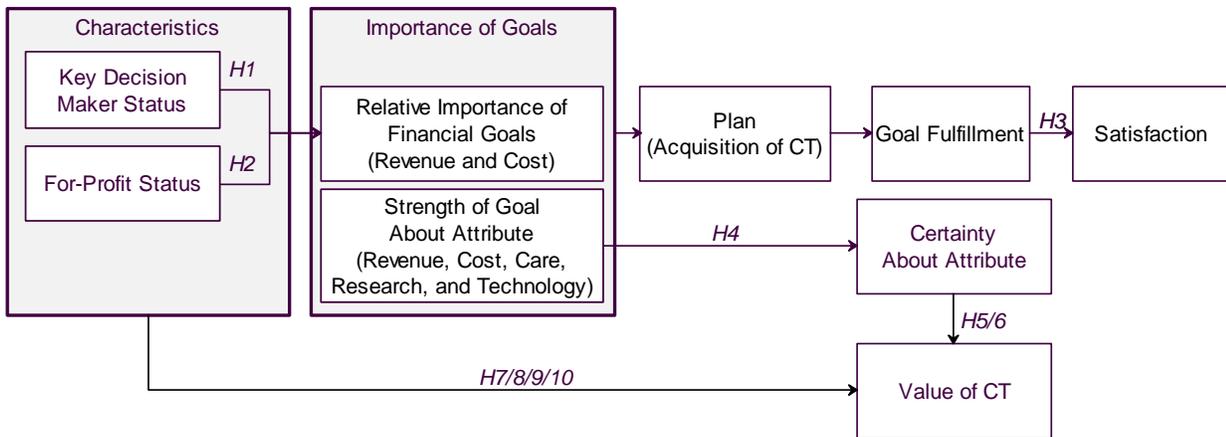


Figure 1: Relationships Explored in Paper (H1 to H4 explored in Pilot, H1 to H10 explored under Fellowship)

Faculty Involvement (Dissertation Committee)

Theoretical Advisor: Howard Kunreuther (OPIM)

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